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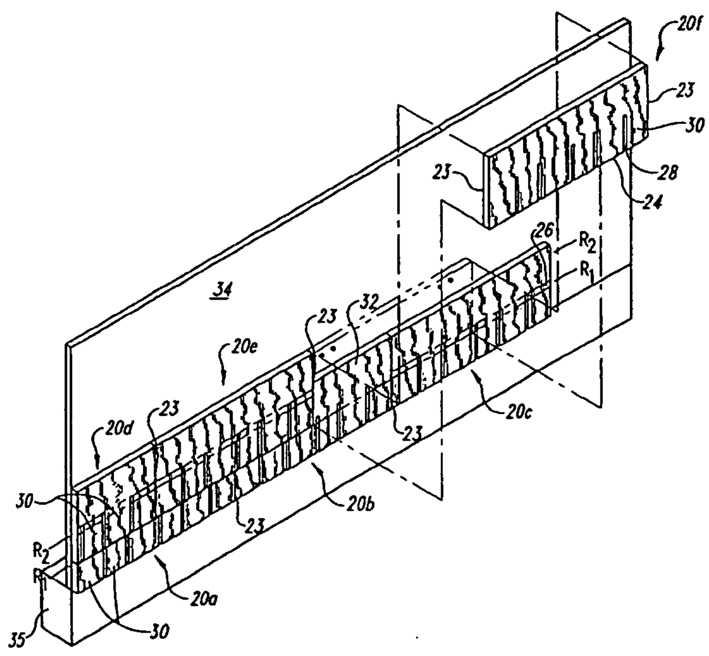
(54) Title: UNITARY MODULAR SHAKE-SIDING PANELS, AND METHODS FOR MAKING AND USING SUCH SHAKE-SIDING PANELS

(57) Abstract

The present disclosure is directed toward unitary modular shake panels, and methods for making and using such shake panels. In one aspect of the invention, a unitary modular shake panel includes an interconnecting section composed of a siding material and several integral shake sections projecting from the interconnecting section. The panel preferably has a quadrilateral shape with first and second edges along a longitudinal dimension that are separated from each other by a width of the panel along a transverse dimension. Additionally, the shake sections are separated from one another by slots extending from the second edge to an intermediate width in the panel. In a preferred embodiment, the panel is composed of a unitary piece of fiber-cement siding with a simulated wood grain running along the transverse dimension. The interconnecting section is preferably a web portion of the fiber-cement siding piece, and the shake sections are different portions of the same fiber-cement siding piece defined by the slots extending in the transverse dimension from the web portion to the second edge of the panel. Modular shake panels in accordance with the invention may be made using several different processes. In one embodiment, for example, a unitary modular shake panel is manufactured by the cutting planks from a sheet of siding material, and then forming slots in the panel to define the web portion and the shake sections. The planks are preferably cut from the sheet in a direction transverse to a wood grain on the surface of the sheet. The slots are preferably cut in the planks in the direction of the wood grain from a longitudinal edge to an intermediate depth within the plank.



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UNITARY MODULAR SHAKE-SIDING PANELS, AND METHODS FOR MAKING AND USING SUCH SHAKE-SIDING PANELS

TECHNICAL FIELD

The present invention generally relates to exterior siding materials for use on exterior walls of houses and other structures. More particularly, the invention is directed toward unitary, modular shake-siding panels composed of fiber-cement siding or other suitable siding materials.

BACKGROUND OF THE INVENTION

The exterior walls of houses and other structures are often protected and decorated with a variety of exterior siding products typically made from wood, vinyl, aluminum, stucco or fiber-cement. Additionally, wood and fiber-cement siding products are generally planks, panels or shakes that are "hung" on plywood or composite walls.

Exterior siding shakes are popular products for protecting and enhancing the exterior appearance of homes, offices and other structures. Exterior siding shakes are typically small, rectilinear pieces of cedar or fiber-cement siding. Cedar siding shakes are generally formed by splitting a cedar block along the grain, and fiber-cement siding shakes are generally formed by cross-cutting a plank of fiber-cement siding having a width corresponding to the width of the individual shakes. Although both cedar and fiber-cement siding shakes are generally rectilinear, the bottom edge of the shakes can be trimmed to different shapes for decorative effect. The bottom edge of the shakes, for example, can be scalloped, triangular, square or a modified square with rounded corners.

To install shake siding, a large number of shakes are individually attached to an exterior wall of a structure using nails, staples or other suitable fasteners. Each shake usually abuts an adjacent shake to form a horizontal row of shakes, and each row of shakes overlaps a portion of an immediately underlying row of shakes. For example, a first row of shakes is attached to the

bottom of the wall, and then each successive row overlaps the top portion of the immediate underlying row. As such, each shake is generally laterally offset from the shakes in the immediately underlying row so that the shakes in one row span across the abutting edges of the shakes in the immediate underlying row.

One concern of wood siding shakes is that wood has several disadvantages in exterior siding applications. Wood siding, for example, may be undesirable in dry climates or in areas subject to brush fires because it is highly flammable. In humid climates, such as Florida, the wood siding shakes are also generally undesirable because they absorb moisture and may warp or crack. Such warping or cracking may not only destroy the aesthetic beauty of the siding, but it may also allow water to damage the underlying wall. Additionally, wood siding shakes are also undesirable in many other applications because insects infest the siding and other structural components of the structure.

Another concern with conventional siding shakes made from cedar or fiber-cement siding is that it is time consuming to individually attach each shake to a wall. Moreover, additional time is required to individually trim certain shakes to fit in irregular areas on the wall, such as edges and corners. Thus, installing conventional siding shakes requires an extensive amount of labor and time.

To reduce the installation time of installing individual shakes, a particular cedar shake panel has been developed that allows a number of individual shakes to be hung contemporaneously. The particular cedar shake panels have a plurality of individual shakes attached to a thin backing strip composed of plywood. More specifically, the top portion of each individual shake is nailed, stapled, glued or otherwise connected to the plywood backing strip. The particular cedar shake panels reduce the labor required to install the shakes because a single panel covers between two and four linear feet of wall space that would otherwise need to be covered by individual shakes. Such cedar shake panels, however, are significantly more expensive than individual shakes because the shakes are still individually attached to the plywood backing strip by the manufacturer. The plywood backing strip also increases the material costs

because it is not required for installing individual shakes. Moreover, the thin plywood backing strip is particularly subject to moisture damage that causes significant warping of the panels and cracking of the shakes. Such cedar shake-siding panels, therefore, are not widely used in humid or wet climates because they are relatively expensive and they have significant long-time performance problems.

SUMMARY OF THE INVENTION

The present invention is directed toward unitary modular shake panels, and methods for making and using such shake panels. In one aspect of the invention, a unitary modular shake panel includes an interconnecting section composed of a siding material and several integral shake sections projecting from the interconnecting section. The panel preferably has a quadrilateral shape with first and second edges along a longitudinal dimension that are separated from each other by a width of the panel along a transverse dimension. Additionally, the shake sections are separated from one another by slots extending from the second edge to an intermediate width in the panel. In a preferred embodiment, the panel is composed of a unitary piece of fiber-cement siding with a simulated wood grain running along the transverse dimension. The interconnecting section is preferably a web portion of the fiber-cement siding piece, and the shake sections are different portions of the same fiber-cement siding piece defined by the slots extending in the transverse dimension from the web portion to the second edge of the panel.

Modular shake panels in accordance with the invention may be made using several different processes. In one embodiment, for example, a plurality of unitary modular shake panels are manufactured by the cutting a plurality of planks from a sheet of siding material, and then forming slots in the planks to define the web portion and the shake sections of each panel. The planks are preferably cut from the sheet in a direction transverse to a wood grain on the surface of the sheet. The slots are preferably cut in the planks in the

direction of the wood grain from a longitudinal edge to an intermediate depth within the planks.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an isometric view of a shake-siding panel in accordance with an embodiment of the invention.

Figure 2 is an isometric view of a method for installing and using the shake-siding panels shown in Figure 1 in accordance with an embodiment of the invention.

Figure 3 is a schematic view of a method for manufacturing shake-siding panels in accordance with the invention.

Figure 4A is a schematic isometric view of a method for manufacturing a sheet of fiber-cement siding material having a transverse running grain.

Figure 4B is a schematic view of another method for manufacturing shake-siding panels from the sheet of fiber-cement siding manufactured according to Figure 4A in accordance with another embodiment of the invention.

Figures 5A-5D are top plan views of several additional embodiments of shake-siding panels illustrating alternate end shapes for the shakes in accordance with other embodiments of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The following description describes unitary modular shake panels, and methods for making and using such shake panels. Although Figures 1-5D and the following description set forth numerous specific details of particular embodiments of the invention to provide a thorough understanding for making and using such embodiments, a person skilled in the relevant art will readily recognize that the present invention can be practiced without one or more of the specific details reflected in the embodiments described in the following description.

Figure 1 illustrates an embodiment of a unitary modular shake panel 20 having a length L along a longitudinal dimension and a width W along a transverse dimension. The length L of the shake panel 20 is typically 4 feet, but the length can also be 8′, 10′, 12′ or virtually any other length. The width W is typically 16 inches, but the width is typically from 6¼ to 24 inches. The shake panel 20 has side edges 23 separated from each other by the length L, a top edge 22 extending along the longitudinal dimension between the upper ends of the side edges 23, and a bottom edge 24 extending along the longitudinal dimension between the bottom ends of the side edges 23. The top and bottom edges 22 and 24 are preferably substantially parallel to each other and separated by the width W of the panel 20. An overlap region 26 defined by the area between a first intermediate width W_1 and a second intermediate width W_2 also extends along the longitudinal dimension of the panel 20. For a typical 16 inch wide panel 20, W_1 is approximately 9 inches and W_2 is approximately 10.5-12 inches to define an overlap region 26 having a width from approximately 1.5 to approximately 3.0 inches.

The particular embodiment of the shake panel 20 shown in Figure 1 includes a web portion 32 and a plurality of shake sections 30 projecting from the web portion 32. The web portion 32 is defined by a longitudinal portion of the panel between the top edge 22 and the first intermediate dimension W_1. The shake sections 30 are defined by transverse portions of the panel 20 between the first intermediate dimension W_1 and the bottom edge 24 that are separated from one another by a plurality of slots 28 formed in the panel 20. The slots 28 preferably extend from the lower edge 24 at least for a distance L_S that terminates in the overlapping region 26. The width of the slots 28 is exaggerated in Figures 1-5D for the purpose of clarity. In practice, the slots 28 preferably have a width from approximately 0.1 inches to approximately 0.25 inches. The shake sections 30 accordingly have widths W_S corresponding to the distance between slots 28. As explained in more detail below, the shake widths W_S may be regular such that all shakes have the same width W_S, or they may be irregular such that the width W_S is different for at least some of the shakes.

The unitary modular shake panels 20 can be made from many suitable siding materials in which the web portion 32 and the shake sections 30 are integrally formed from the same piece of siding material. In a preferred embodiment, the shake panels 20 are pieces of fiber-cement siding having a simulated wood grain 27 formed on an exterior surface. The shake sections 30 and the web portion 32 of a particular panel 20 are preferably formed from a single piece of fiber-cement siding. Additionally, the slots 28 preferably extend in the direction of the simulated wood grain 27. Thus, the slots 28 and the grain 27 give the appearance of individual shakes to each shake section 30.

Figure 2 illustrates an embodiment of a method for installing and using the modular shake panels 20 on a typical wall 34. A plurality of shake panels 20a-20c are attached to the wall 34 along a bottom row R_1-R_1 near a foundation 35 of a structure. The side edges 23 of one panel abut the side edges 23 of an adjacent panel (*e.g.*, shown between panels 20b and 20c). After installing the panels 20a-20c along the bottom row R_1-R_1, another set of shake panels 20d-20f are installed along a second row R_2-R_2. The shake sections 30 of the panels 20d-20f in the second row R_2-R_2 overlap the web portions 32 and an upper segment of the shake sections 30 of each panel 20a-20c in the first row R_1-R_1. More specifically, the bottom edges 24 of the panels 20d-20f are within the overlap region 26 of the panels 20a-20c. Additionally, the shake sections 30 of the panels 20d-20f preferably cover the abutting edges between the panels 20a-20c.

In some applications, it is necessary to use partial shake panels. In any given installation, for example, the height and/or width of a wall may not be evenly divisible by the full length of the shake panels, or the wall may not be rectilinear. These two factors, combined with the lateral offset of each row relative to the row below it, may result in a space along a particular row of shake panels less than the full-length of a shake panel. In these situations, a partial shake panel (*e.g.*, panel 20d) is cut to fit in the available space.

The embodiments of unitary modular shake panels 20 shown in Figures 1 and 2 generally reduce the time required to install shake siding

compared to individual wood or fiber-cement shakes. As discussed above with reference to the background of the invention, it is time consuming to individually install each shake. The unitary modular shake panels 20, however, cover 4-12 linear feet wall space with shake sections 30 in a short period of time. Moreover, when the web portion 32 of one panel (*e.g.*, panel 20a in Figure 2) is covered by the shake sections 30 of an overlying panel (*e.g.*, panel 20e in Figure 2), the shake sections of the underlying panel appear to be individual shakes. A row of modular shake panels 20, therefore, may not only be installed in less time than a row of individual conventional shakes, but the row of shake panels 20 provides an aesthetically pleasing "shaked" appearance.

In addition to reducing installation time, when the modular shake-siding panels 20 are composed of fiber-cement siding material, they reduce cracking or warping damage compared to conventional wood shakes or conventional wood-shake panels. As discussed above with reference to the background section, conventional wood shakes and wood-shake panels are flammable and subject to moisture and/or insect damage. Conventional wood-shake panels, for example, are easily damaged by moisture because the thin plywood backing strip is particularly susceptible to delamination or warping in humid or wet environments. In contrast to conventional wood-shake panels, the fiber-cement shake panels 20 are highly resistant to fire, moisture and insects. Thus, the fiber-cement shake panels 20 are expected to last much longer than conventional wood-shake panels with a plywood backing strip or wood shakes.

Figure 3 illustrates one embodiment of a method for manufacturing the unitary modular shake panels 20. At an initial stage of this method, a plurality of siding planks 50 are formed by cross-cutting a sheet 48 of siding material along lines C-C transverse to a grain direction G-G of the grain 27. The sheet 48 preferably has a width equal to the length L of the shake panels 20 and a length evenly divisible by the width W of the shake panels 20. Each cross-cut accordingly forms a unitary plank 50 of siding material having the overall dimensions of a modular shake panel 20. A series of slots 28 are then formed along an edge of each plank 50 to fabricate the shake panels 20 with the shake

sections 30 and the web portion 32. The slots 28 are preferably cut into the planks 50 to create a one-piece unitary modular shake panel 20. In other embodiments, however, the slots 28 may be formed in the planks 50 by molding, stamping or other suitable processes.

The planks 50 are preferably cut from a sheet 48 composed of fiber-cement siding material using a large shear having opposing serrated blades that span across the width of the panel 48. Suitable shears, for example, are similar to the Model Nos. SS 100 or SS 110 pneumatic shears manufactured by Pacific International Tool and Shear, and disclosed in U.S. Patent Nos. 5,570,678 and 5,722,386, which are herein incorporated by reference. The planks 50 may also be cut from the sheet using a high-pressure fluid-jet or an abrasive disk. Suitable high-pressure fluid-jet cutting systems are manufactured by Flow International Corporation of Kent, Washington.

The slots 28 are preferably cut in planks 50 composed of fiber-cement siding material using a reciprocating blade shear. For example, suitable reciprocating blade shears are the Model Nos. SS 302 and SS 303 shears also manufactured by Pacific International Tool and Shear of Kingston, Washington, and disclosed in a U.S. Patent Application entitle "HAND-HELD CUTTING TOOL FOR CUTTING FIBER-CEMENT SIDING," and filed on March 6, 1998, which is herein incorporated by reference. The slots 28 can be also cut in fiber-cement siding planks 50 using high-pressure fluid-jets or abrasive disks.

Figures 4A and 4B illustrate another embodiment of a method for manufacturing long unitary modular shake panels composed of a fiber-cement siding material. Referring to Figure 4A, a long sheet 130 of fiber-cement siding material is formed through a roller assembly 160 having a first roller 162 and a second roller 164. The first roller 162 has a grain pattern 166 in which the grain direction G-G extends generally transversely to the travel path "P" of the long sheet 130. The second roller 164 is partially submersed in a container 170 holding a fiber-cement slurry 132. In operation, the second roller 164 rotates through the slurry and picks up a layer 134 of fiber-cement siding material. The first roller 162 rotates with the second roller 164 to press the fiber-cement layer

134 to a desired sheet thickness and to emboss a grain pattern onto the long sheet 130 that runs generally transverse to the length of the long sheet 130. After the long sheet 130 is formed, a water-jet cuts the long sheet 130 along line 136 to form a sheet 148 of fiber-cement siding material with a width W_0 and a grain pattern 147 running along the grain direction G-G transverse to a length L_0 of the sheet 148. It will be appreciated that forming the sheet 48 (Figure 3) of fiber-cement siding with a grain 27 extending generally along the length of the sheet 48 is known in the art. Unlike the conventional sheet 48, the fiber-cement siding sheet 148 of Figure 4A has the grain pattern 147 running in a grain direction G-G transverse to the length of the sheet 148.

Referring to Figure 4B, another water-jet cutting assembly (not shown) cuts a plurality of long planks 150 from the fiber-cement siding sheet 148. In one particular embodiment, two separate water-jets cut the sheet 148 along lines 149a to trim the sides of the sheet 148, and two more water-jets cut the sheet 148 along lines 149b to separate the planks 150. Each plank 150 has a portion of the grain pattern 147 extending generally transverse to the length L_0. After the planks 150 are formed, a number of slots 28 are cut in the planks 150 to form long modular shake panels 120 with a plurality of shake sections 30 extending from an integral web portion 32.

The particular embodiments of the methods for manufacturing unitary modular shake panels described above with reference to Figures 3-4B are economical and fast. As described above with reference to the background of the invention, conventional wood shake-siding panels are manufactured by individually attaching wood shakes to a separate plywood backing strip. Conventional processes for manufacturing wood shake-siding panels, therefore, are inefficient because each shake must be split from a block and then individually attached to the plywood backing member. With the unitary modular shake panels 20 or 120, however, the planks 50 or 150 are simply cut from a sheet of siding material, and then all of the shake sections 30 are quickly formed in the planks 50 and 150 by cutting the slots 28. Moreover, the unitary shake-siding panels 20 and 120 do not require an additional, separate backing member

or fasteners to attach individual shakes to such a separate backing member. Thus, compared to conventional wood shake-siding panels, the methods for fabricating the unitary shake-siding panels 20 and 120 are expected to reduce the material and labor costs.

In addition to the advantages described above, the particular embodiment of the method for fabricating the long unitary fiber-cement shake-siding panels 120 is particularly advantageous for saving time in both manufacturing and installing the shake-siding panels 120. For example, compared to cutting planks 50 from a 4′ x 8′ sheet 48 of fiber-cement siding to have a length of 4 feet, the planks 150 may be cut in much longer lengths (*e.g.*, 12 feet). As such, a significant amount of board feet of completed fiber-cement shake-siding panels 120 may be manufactured with simple, long cuts that require less time and labor than making the planks 50. Moreover, because the siding panels 120 are longer than siding panels 20, more linear footage of wall space may be covered by hanging a panel 120 than a panel 20 in about the same time. Thus, the long siding panels 120 are generally expected to also reduce the time and labor required to install fiber-cement siding shakes.

Figures 5A-5D illustrate several possible shapes for the ends of the shake sections 30. For example, Figure 5A illustrates a shake-siding panel 220a with regular width shake sections 230a having rounded or scalloped ends 240a. Figure 5A also shows a similar shake panel 220b with irregular width shake sections 230b having rounded ends 280b. Figure 5B illustrates a regular panel 320a and an irregular panel 320b that have shake sections 330 with triangular, pointed ends 340. Figure 5C shows another regular panel 420a and another irregular panel 420b that have shake sections 430 with partially rounded ends 440. The non-rectilinear shake ends are useful for enhancing the flexibility in designing the exterior of a house or office. For example, Victorian houses usually use shakes having scalloped ends. Figure 5D shows yet another regular panel 520a and irregular panel 520b that have shake sections 530 with different lengths to develop a rough “wood-lodge” appearance.

Although specific embodiments of the present invention are described herein for illustrative purposes, persons skilled in the relevant art will recognize that various equivalent modifications are possible within the scope of the invention. The foregoing description accordingly applies to other unitary modular shake panels, and methods for making and using such shake-panels. In general, therefore, the terms in the following claims should not be construed to limit the invention to the specific embodiments disclosed in the specification. Thus, the invention is not limited by the foregoing description, but instead the scope of the invention is determined entirely by the following claims.

CLAIMS

1. A modular shake panel comprising:

a panel of siding material having first and second longitudinal edges extending along a longitudinal dimension, the first and second edges being spaced apart from one another by a width transverse to the longitudinal dimension, and a plurality of slots extending transverse to the longitudinal dimension from the second edge to an intermediate location in the panel between the first and second edges to define an interconnecting section of the panel and a plurality of integral shake sections projecting from the interconnecting section.

2. The modular shake panel of claim 1 wherein the slots have widths from approximately 0.1 inches to approximately 0.3 inches.

3. The modular shake panel of claim 1 wherein the slots are irregularly spaced in the longitudinal direction.

4. The modular shake panel of claim 1 wherein the slots are regularly spaced in the longitudinal direction.

5. The modular shake panel of claim 1 wherein the panel of siding material comprises fiber-cement siding.

6. The modular shake panel of claim 5 wherein the fiber-cement panel has a simulated wood grain running generally in a direction along the transverse dimension.

7. The modular shake panel of claim 6 wherein the panel has a length of at least six feet along the longitudinal dimension, the grain running transverse to the longitudinal dimension.

8. A unitary modular shake panel comprising:

a web portion having a length along a longitudinal dimension and a width along a transverse dimension; and

a plurality of shake sections projecting transversely from the web, the shake sections being integral with the web, and the shake sections being spaced apart from one another along the longitudinal dimension of the web.

9. The unitary modular shake panel of claim 8 wherein a length of the shake sections along the transverse dimension is a selected portion of the width of the panel.

10. The unitary modular shake panel of claim 8 wherein the shake sections have widths along the longitudinal dimension from approximately 1.0 inch to approximately 16 inches.

11. The unitary modular shake panel of claim 8 wherein the shake panel has at least a first shake section and a second shake section, the first shake section having a different width than the second shake section.

12. The unitary modular shake panel of claim 8 wherein the shake panel has at least a first shake section and a second shake section, the first shake section having a width at least substantially equal to the width of the second shake section.

13. The unitary modular shake panel of claim 8 wherein the panel comprises fiber-cement siding.

14. The unitary modular shake panel of claim 13 wherein the shake panel has a simulated wood grain running generally across the panel in a grain direction along the transverse dimension.

15. A unitary modular shake panel having a longitudinal dimension and a transverse dimension, comprising:

an interconnecting section defined by a first portion of the panel extending in the longitudinal dimension between a first longitudinal edge of the panel and an intermediate width of the panel; and

a plurality of shake sections defined by a second portion of the panel integral with the interconnecting section, each shake section projecting from the interconnecting section along the transverse dimension, and the shake sections being spaced apart from one another by gaps extending from the intermediate width of the panel.

16. The modular shake panel of claim 15 wherein the gaps have widths from approximately 0.1 inches to approximately 0.3 inches.

17. The modular shake panel of claim 15 wherein the gaps are irregularly spaced apart from one another in the longitudinal dimension.

18. The modular shake panel of claim 15 wherein the gaps are regularly spaced apart from one another in the longitudinal dimension.

19. The modular shake panel of claim 15 wherein the panel comprises fiber-cement siding material.

20. The modular shake panel of claim 19 wherein the fiber-cement panel has a simulated wood grain.

21. The modular shake panel of claim 20 wherein the panel has a length at least six feet long along the longitudinal dimension, the simulated grain running transverse to the longitudinal dimension.

22. A method of manufacturing unitary modular shake panels, comprising:

forming a plurality of slots in a plank of siding material having first and second longitudinal edges extending along a longitudinal dimension and spaced apart from one another by a width transverse to the longitudinal dimension, the slots extending transversely from the second longitudinal edge of the plank to an intermediate width within the plank, and the slots being located at different longitudinal positions along the second longitudinal edge to define an interconnecting section of the plank and a plurality of integral shake sections projecting from the interconnecting section.

23. The method of claim 22 wherein forming the slots comprises cutting the slots in the plank from the second longitudinal edge to the intermediate width.

24. The method of claim 22 wherein forming the slots comprises molding the slots in the plank from the second longitudinal edge to the intermediate width.

25. The method of claim 22 wherein forming the slots comprises stamping the slots in the plank from the second longitudinal edge to the intermediate width.

26. The method of claim 22, further comprising forming the slots at a plurality of regularly spaced longitudinal positions along the second longitudinal edge of the plank.

27. The method of claim 22, further comprising forming the slots at a plurality of irregularly spaced longitudinal positions along the second longitudinal edge of the plank.

28. The method of claim 22, further comprising cutting a plurality of planks from a sheet of fiber-cement siding material having a longitudinal dimension, a transverse dimension and a simulated wood grain running in a grain direction along the longitudinal dimension, wherein the planks are cut along the transverse dimension from the sheet of siding material.

29. The method of claim 2, further comprising cutting a plurality of planks from a sheet of fiber-cement siding material having a longitudinal dimension, a transverse dimension and a wood grain running in a grain direction along the transverse dimension, wherein the planks are cut along the longitudinal dimension from the sheet of siding material.

30. A method of manufacturing unitary modular shake panels, comprising:

forming a plurality of shake sections along a web portion, each shake section being an integral projection of the web portion, and each shake having side edges extending at least substantially perpendicular to the web portion.

31. The method of claim 30 wherein forming the shake sections comprises cutting a plurality of slots in a plank to leave the web portion and the shake sections projecting from the web portion.

32. The method of claim 30 wherein forming the shake sections comprises molding a plurality of slots in a portion of a plank to leave the web portion and the shake sections projecting from the web portion.

33. The method of claim 30 wherein forming the shake sections comprises stamping a plurality of slots in a plank to leave the web portion and the shake sections projecting from the web portion.

34. The method of claim 30, further comprising forming the shake sections at a plurality of regularly spaced positions along a plank to leave the web portion and the shake sections projecting from the web portion.

35. The method of claim 30, further comprising forming the shake sections at a plurality of irregularly spaced positions along a plank to leave the web portion and the shake sections projecting from the web portion.

36. The method of claim 30, further comprising cutting a plurality of planks from a sheet of fiber-cement siding material having a longitudinal dimension, a transverse dimension and a simulated wood grain running in a grain direction along the longitudinal dimension, wherein the planks are cut along the transverse dimension from the sheet of siding material.

37. The method of claim 30, further comprising cutting a plurality of planks from a sheet of fiber-cement siding material having a longitudinal dimension, a transverse dimension and a simulated wood grain running in a grain direction along the transverse dimension, wherein the planks are cut along the longitudinal dimension from the sheet of siding material.

38. A method of manufacturing unitary modular shake panels comprising:

embossing a simulated wood grain onto a surface of a fiber-cement siding sheet so that the grain runs in a grain direction transverse to a longitudinal dimension of the sheet;

cutting a plurality of planks from the sheet along the longitudinal dimension of the sheet, each plank having a length at least approximately equal to the longitudinal dimension of the sheet and a width transverse to the longitudinal dimension; and

forming a plurality of slots in at least a first plank cut from the sheet, each slot extending transversely from a longitudinal edge of the first plank to an intermediate width within the first plank, and the slots being spaced apart from one another along the longitudinal edge to define an interconnecting section of the first plank and a plurality of integral shake sections projecting from the interconnecting section.

39. The method of claim 38 wherein forming the slots in the first plank comprises cutting the first plank from the longitudinal edge to an intermediate point within the first plank.

40. The method of claim 38 wherein forming the slots in the first plank comprises molding the slots in the first plank.

41. The method of claim 38 wherein forming the slots in the first plank comprises stamping the slots in the first plank.

42. A method of using unitary modular shake panels comprising:

attaching a first row of unitary modular shake panels to a wall, each shake panel having first and second longitudinal edges extending along a longitudinal panel dimension and being separated by a panel width, each shake panel having side edges along a transverse dimension separated by the first and second longitudinal edges, each panel having a longitudinal overlap zone between a first intermediate panel width and a second intermediate panel width, and each shake panel having a web portion and a plurality of shake sections integral with the web portion and projecting from the web portion, wherein the first row of panels is attached to the wall such that a side edge of one panel abuts a side edge of an adjacent panel; and

attaching a second row of unitary modular shake panels to the wall, wherein the second row of shake panels are attached to the wall to overlap the first row of shake panels to a location in the overlap zone of the first row of shake panels.

43. The method of claim 42, further comprising positioning each panel of the second row such that a shake section in the second row overlaps the abutting side edges of a pair of panels in the first row.

44. The method of claim 42, further comprising trimming a selected unitary modular shake panel into a selected size and shape such that the selected shake panel fits in a wall space less than a full length panel.

45. A unitary modular shake panel produced by a process, comprising:

embossing a simulated wood grain onto a surface of a fiber-cement siding sheet so that the grain generally runs in a grain direction transverse to a longitudinal dimension of the sheet;

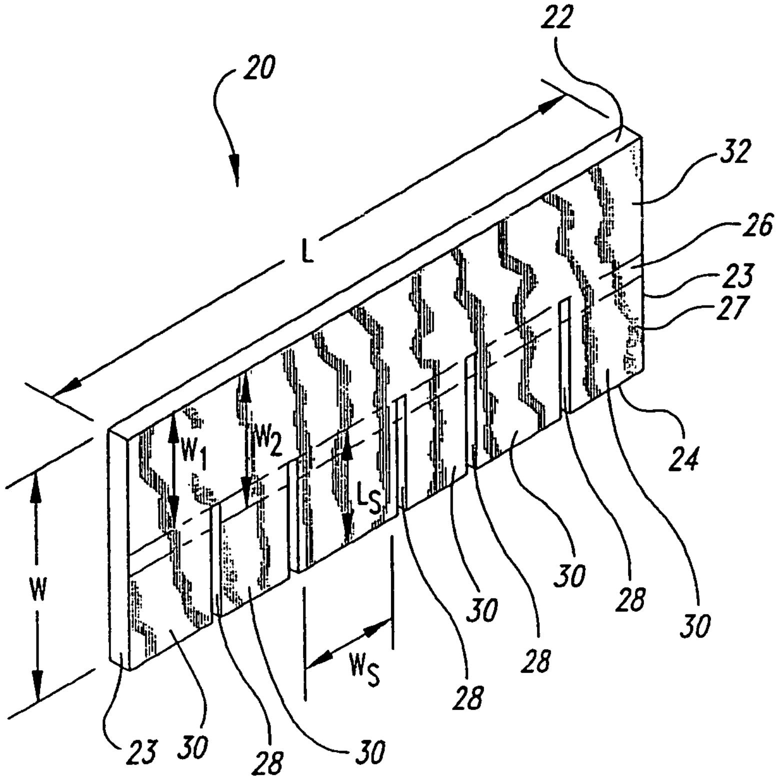
cutting a plurality of planks from the sheet along the longitudinal dimension of the sheet, each plank having a length at least approximately equal to the longitudinal dimension of the sheet and a width equal to a desired panel width; and

forming a plurality of slots in at least a first plank cut from the sheet, the slots extending transversely from a longitudinal edge of the first plank to an intermediate width within the first plank, and the slots being located at different longitudinal positions along the longitudinal edge to define an interconnecting section of the plank and a plurality of integral shake sections projecting from the interconnecting section.

46. A unitary modular shake panel made by a process, comprising:

forming a plurality of slots in a plank of siding material having first and second longitudinal edges extending along a longitudinal dimension and spaced apart from one another by a width transverse to the longitudinal dimension, the slots extending transversely from the second longitudinal edge of the sheet to an intermediate width within the sheet and being located at different longitudinal

positions along the edge to define an interconnecting section of the sheet and a plurality of integral shake sections projecting from the interconnecting section.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22
32
26
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24
L
W
W_1
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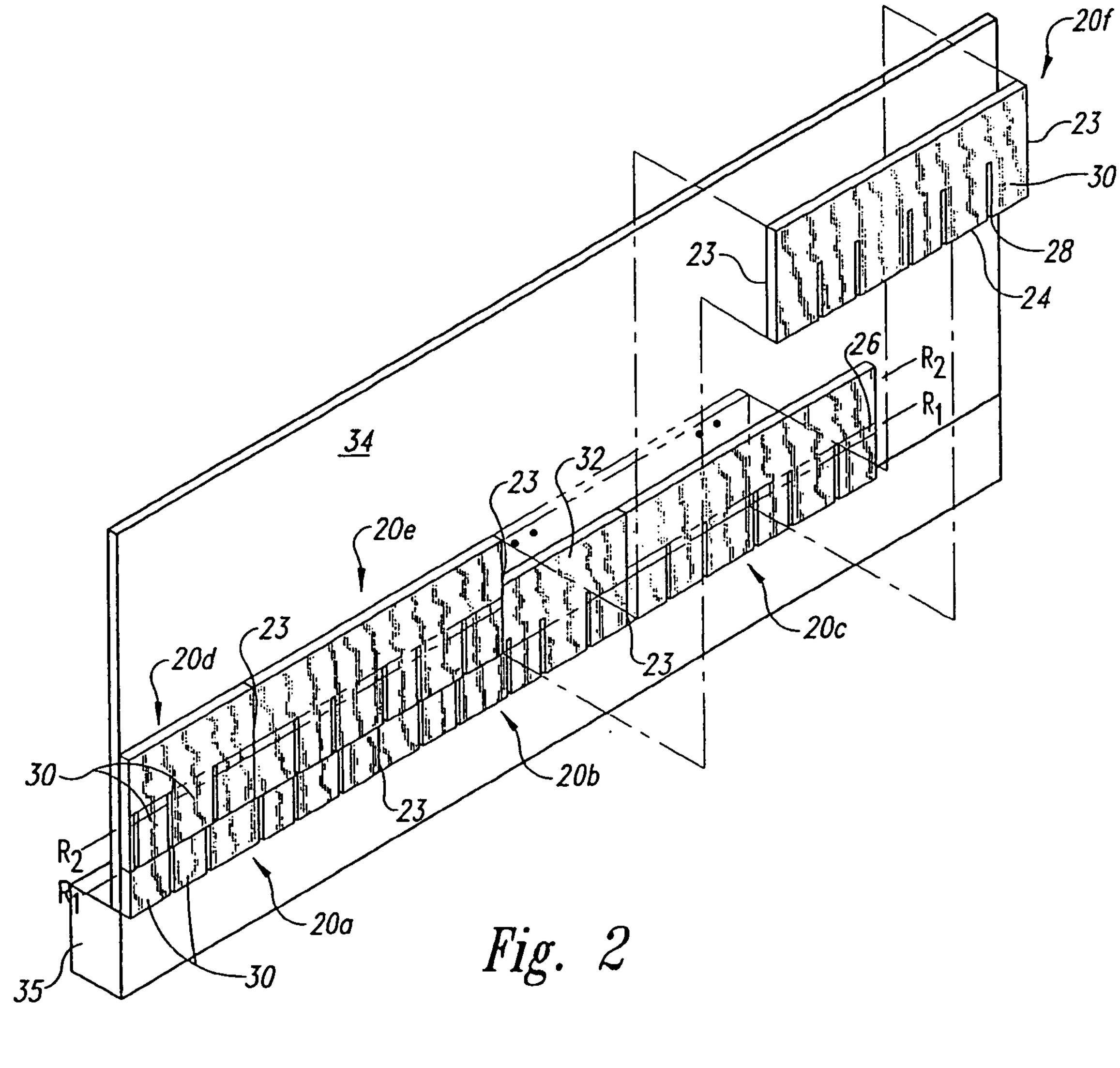
Fig. 1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28
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R_2
R_1
34
32
23
20e
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20d
23
20c
20b
23
23
30
R_2
R_1
20a
35
30

Fig. 2

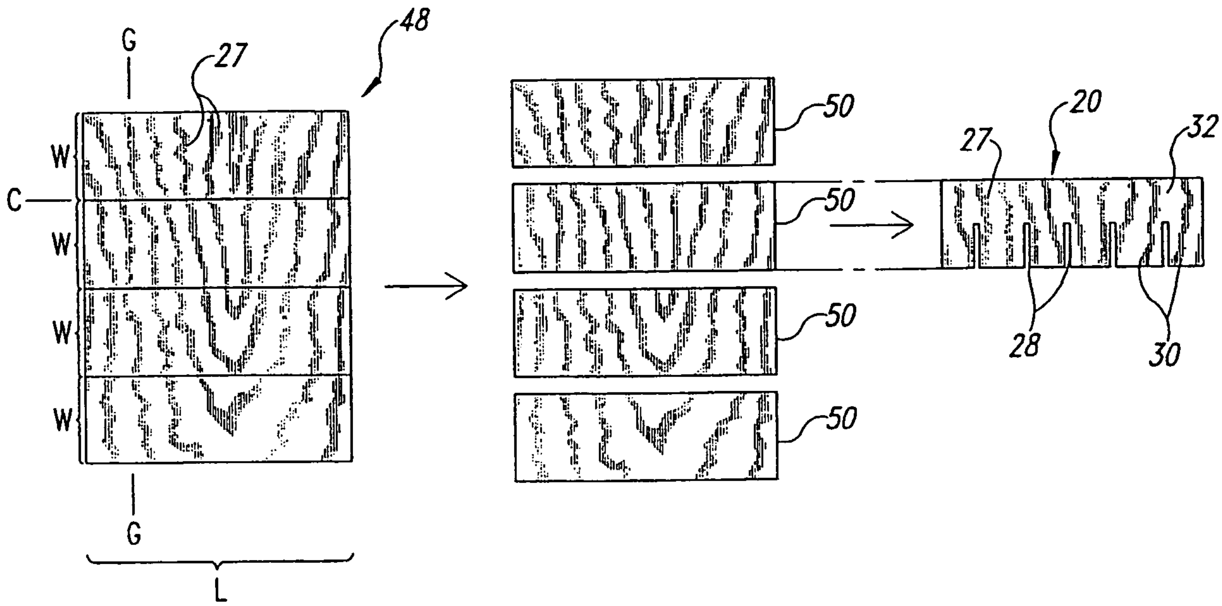

Fig. 3

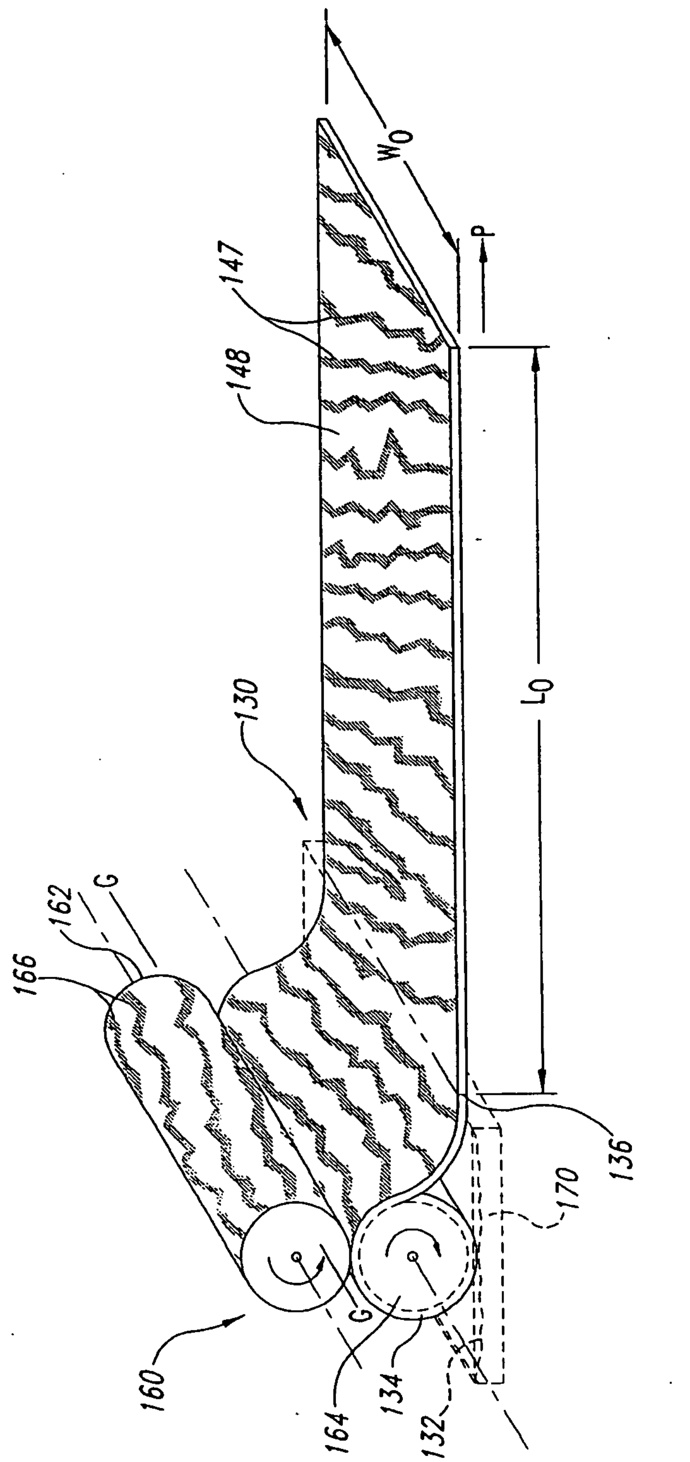

Fig. 4A

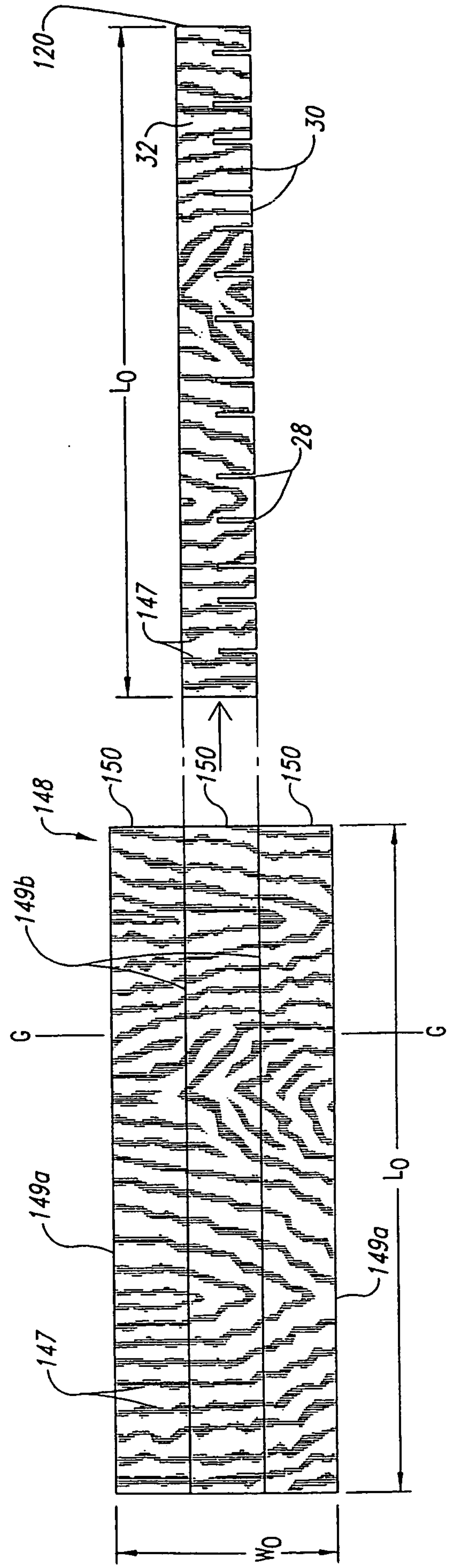

Fig. 4B

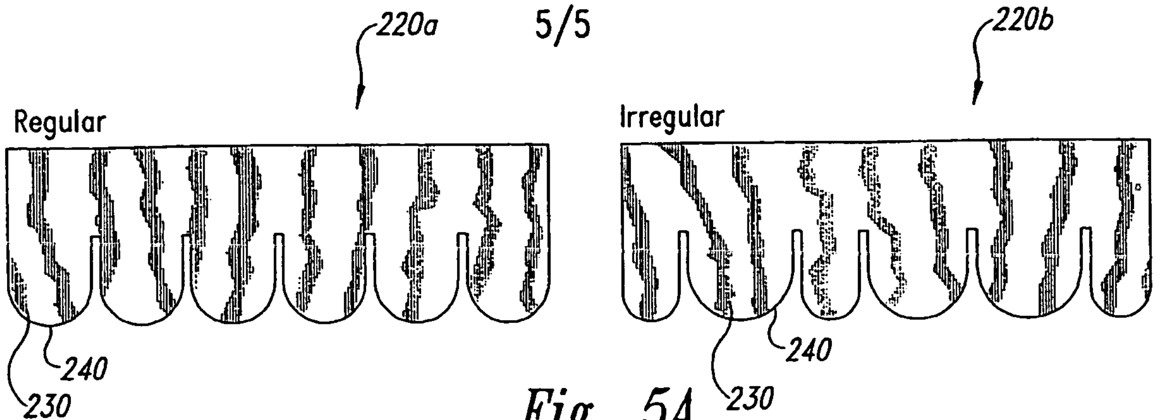

Fig. 5A

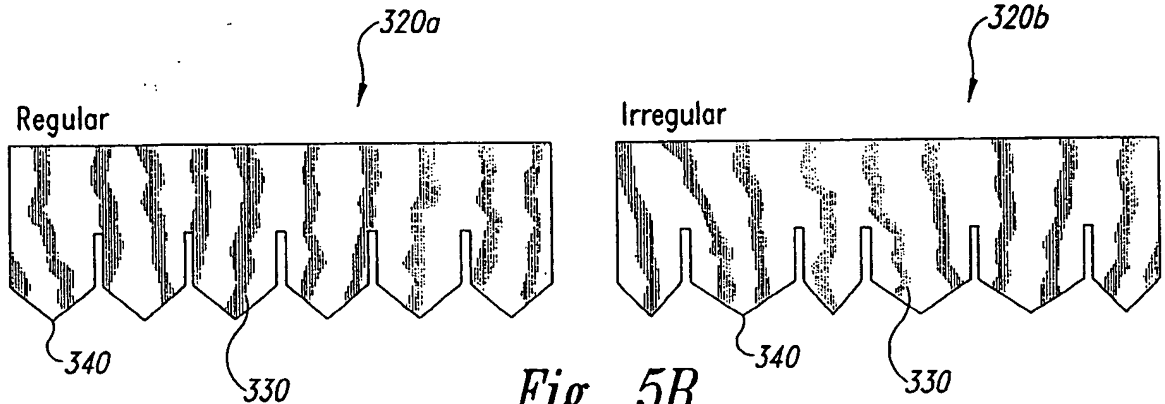

Fig. 5B

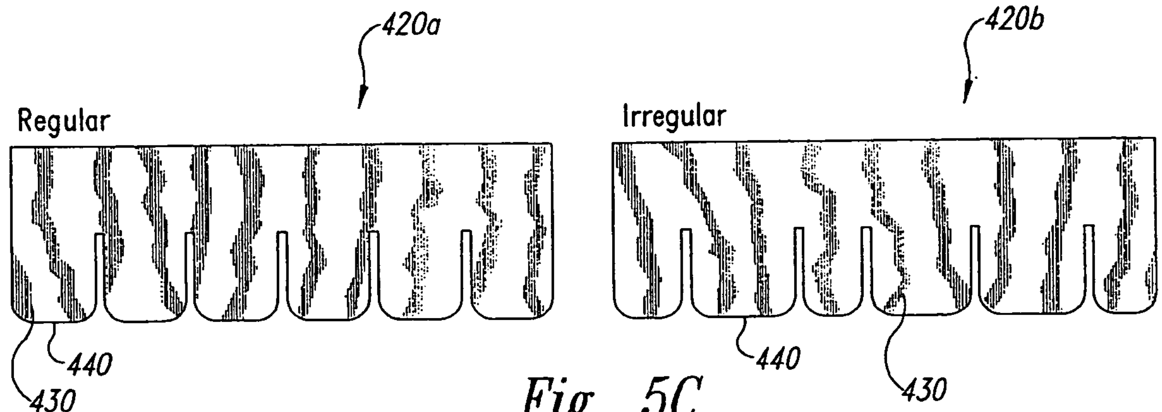

Fig. 5C

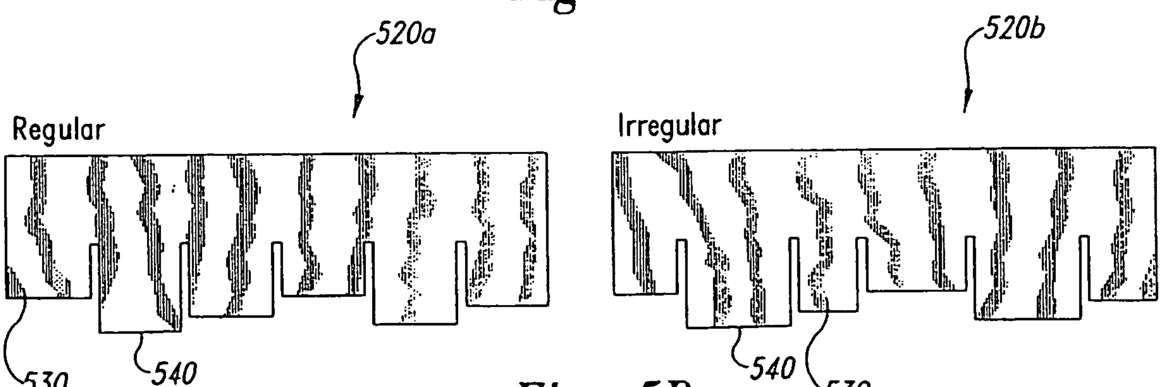

Fig. 5D

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/10059

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 E04D1/26 E04F13/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 E04D E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 171 010 A (SCHUETZ ET AL.) 29 August 1939 (1939-08-29)	1,3,5, 8-11,13, 15,17, 19,22, 27,30, 35,42,43
Y	page 1, column 1, line 9 - page 1, column 1, line 15 page 1, column 2, line 5 - page 1, column 2, line 20 page 2, column 1, line 14 - page 2, column 1, line 29 page 2, column 2, line 43 - page 2, column 2, line 55 page 2, column 2, line 72 - page 3, column 1, line 6 page 4, column 1, line 43 - page 4, -/--	6,7,14, 20,21, 28,29, 36,37,44

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 August 1999	12/08/1999

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hendrickx, X

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	column 1, line 52 figures 1-8 ---	
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Y	page 1, line 28 - page 1, line 5	6,7,14, 20,21,44
A	page 1, line 53 - page 1, line 71 page 2, line 16 - page 2, line 54 figures 1,2 ---	40
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Y	page 1, line 39 - page 1, line 42 page 2, line 35 - page 2, line 145 page 3, line 10 - page 3, line 34 page 1-9 ---	6,14,20, 28,29, 36-39, 44,45
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Y	page 1, line 60 - page 1, line 92 page 2, line 25 - page 2, line 64 figures 1-3 ---	28,29, 36,37,44

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/10059

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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Y	column 3, line 22 - column 3, line 29 column 5, line 21 - column 5, line 38 figures 3,4 ---	44
X	US 2 174 098 A (STEIN) 26 September 1939 (1939-09-26)	1,8,15, 22,25, 26,30, 33,34
Y	page 1, column 2, line 48 - page 1, column 2, line 51	28,29, 36,37,44
A	figures 1-6 ---	41
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

International Application No
PCT/US 99/10059

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